

CLAIMS

What is Claimed is:

1. A power generating apparatus for generating power utilizing a pressure
5 difference between vacuum pressure and atmospheric pressure, the apparatus comprising:

a holder;

a rotator which is rotatably supported with respect to the holder so as to be rotated
in one direction around a horizontal axis, and in which liquid is enclosed;

two or more actuators provided at equal intervals around the periphery of the
10 rotator; and

a guide rail provided so as to be inclined from its starting end, located above the
rotator, to its terminal end located downwardly in a rotational direction of the rotator,

wherein each of the actuators has:

a cylinder that is provided at the periphery of the rotator and is communicated
15 with the inside of the rotator;

a piston that is inserted into the cylinder and is reciprocated in an axial direction of
the cylinder between an upper end point and a lower end point thereof;

a piston rod connected to the piston;

a roller that is attached to a tip of the piston rod and is rolled on the guide rail; and

20 a locking mechanism for switching each of the actuators between a fixed state in
which the piston is fixed at the upper end point so that the reciprocation of the piston is
restricted, and a movable state in which the reciprocation of the piston is allowed,

wherein the liquid is enclosed in the inside of the rotator and that of each cylinder
such that a liquid level is formed within the cylinder of at least one of the actuators located
25 at an upper part of the rotator, and a state in which a vacuum is produced above the liquid

level within the cylinder is defined as an initial state, and

wherein the apparatus rotates the rotator by allowing the plurality of actuators to sequentially repeat:

a first step in which the actuator, whose cylinder has a vacuum produced therein,
5 is switched to the movable state by the locking mechanism, and the piston located at the upper end point of the cylinder is retracted into the cylinder utilizing a pressure difference between vacuum pressure and atmospheric pressure;

a second step in which the roller of the actuator switched to the movable state is engaged with a part of the guide rail in the vicinity of the starting end thereof;

10 a third step in which due to the engagement of the roller with the guide rail, the cylinder of the actuator is moved relative to the piston, and torque is provided to the rotator;

a fourth step in which the relative movement of the cylinder is continued, and with the ensuing rotation of the rotator, the roller is rolled on the guide rail;

15 a fifth step in which upon arrival of the roller at the terminal end of the guide rail, the piston is located at the lower end point of the cylinder, and furthermore, the cylinder is located below the liquid level, thus vanishing the vacuum within the cylinder;

a sixth step in which after the roller has left the terminal end of the guide rail, the piston is moved to the upper end point of the cylinder due to the weight of the liquid and
20 the weight of the piston, piston rod and roller;

a seventh step in which the actuator, whose piston has moved to the upper end point, is switched to the fixed state by the locking mechanism; and

an eighth step in which the actuator switched to the fixed state is moved above the liquid level with the rotation of the rotator, and a vacuum is produced again within the
25 cylinder of the actuator.

2. The power generating apparatus according to Claim 1,

wherein the cylinder of each of the actuators comprises: a base portion protruded in a radial direction from the peripheral surface of the rotator; and an actuating portion that
5 is bended at an outer end of the base portion and is extended in the rotational direction of the rotator, and

wherein the piston is reciprocated within the actuating portion.

3. The power generating apparatus according to Claim 1,

10 wherein the cylinder of each of the actuators is protruded linearly in a radial direction from the peripheral surface of the rotator.

4. The power generating apparatus according to Claim 1,

wherein the apparatus further comprises: an air vent pipe communicated with the
15 cylinder of at least one of the actuators; and a liquid supply pipe provided in the vicinity of the air vent pipe at the peripheral surface of the rotator, and

wherein an opened end of the liquid supply pipe is located above that of the air vent pipe when the opened end of the liquid supply pipe is located at a top part of the rotator.

20 5. The power generating apparatus according to Claim 1,

wherein the locking mechanism has an actuating lever, and

wherein the apparatus further comprises:

unlocking means, provided in the vicinity of the upper part of the rotator, for
operating the actuating lever so as to switch the actuator from the fixed state to the movable
25 state; and

locking means, provided in the vicinity of a lower part of the rotator, for operating the actuating lever so as to switch the actuator from the movable state to the fixed state.

6. The power generating apparatus according to Claim 1,
5 wherein the apparatus further comprises a starter for providing an initial torque to the rotator.

7. The power generating apparatus according to Claim 1,
wherein the apparatus further comprises a constant speed device for keeping the
10 rotational speed of the rotator at a constant speed.